

**Recommendations of the National Environmental Trust to the  
U.S. House of Representatives Committee on Energy and Commerce  
Regarding Climate Change Legislation**

Submitted March 19, 2007

Until now, U.S. climate change policy at the federal level has consisted of purely voluntary (and purely ineffective) programs to reduce greenhouse gas emissions, a relatively small amount of support for research and development, and a weak subset of energy policies that focus on energy efficiency and renewable energy.

Instead, the overwhelming scientific evidence of the adverse effects of impending climate change should compel the United States to create a mandatory federal policy to vastly reduce greenhouse gas (GHG) emissions – and do it quickly. To avert the worst consequences of global warming, the world must stabilize emissions between 2015 and 2025 and reduce up to 80% of its emissions by mid-century. Meeting that goal will require reductions from all sources of GHGs, including carbon dioxide from electricity generating power plants and the transportation sector, plus methane from coal mines and landfills.

The challenge before the Committee is to design a program that guarantees the necessary level of environmental protection in a way that spurs the U.S. economy to develop new technologies to meet these goals, while simultaneously stimulating job creation and protecting consumers. Fortunately the Committee can draw from the success of previous anti-pollution measures, like the Acid Rain Program of the Clean Air Act, learn from the experience of states and other countries, and benefit from the country's flagship research institutions and government agencies. The comments below are derived from NET's analysis of that research and experience.

**I. Acting in Timely Manner**

NET recommends that the Committee consider and report out climate legislation as quickly as possible. This is based on the recommendations of the world's scientists, the need to spur technological development and deployment, the economic implications caused by delay, and the importance of ensuring an equitable international response to this truly global problem.

Earlier this year, the Intergovernmental Panel on Climate Change (IPCC) issued the first section of its fourth assessment, using its strongest language to date on the need for the world to step up its efforts to reduce greenhouse gas emissions. Even before the IPCC report, Dr. James Hansen, director of NASA's Goddard Institute for Space Studies said,

*“We have to stabilize emissions of carbon dioxide within a decade, or temperatures will warm by more than one degree. That will be warmer than it has been for half a million years, and many things could become unstoppable.... We don't have much time left.”*

The most comprehensive research into the economics of climate change was published at the end of 2006, commissioned by the United Kingdom Treasury and carried out by Sir Nicholas Stern, former Chief Economist and Senior Vice President of the World Bank. He concluded that the cost of doing nothing far outweighs the costs of reducing greenhouse gases. The Stern study finds that GHG emissions could more than triple by the end of the century, resulting in a 50% risk of exceeding a 5 degree global average temperature rise during the following decades. The chart on the next page is a useful illustration of the kinds of impacts the world will experience as the temperature climbs. Setting a carbon limit soon is also necessary to accelerate the development and deployment of new technologies that will enable the U.S. to convert its most fossil-fuel-dependent industries to more efficient and less polluting processes. For example, the electric power industry contributes approximately 40% of the country's carbon dioxide emissions – mostly from coal-fired power plants.

Because of this, CEOs and investors alike are dangerously gambling with shareholders and ratepayer dollars as they propose to build over 150 coal-fired power plants around the country, few of which would be able to economically capture their carbon emissions once regulation is in place. Construction of these plants would produce an increase of 500 million tons of carbon dioxide per year from the U.S. power sector, and an estimated 30 billion additional tons of carbon dioxide over the useful lives of the units.

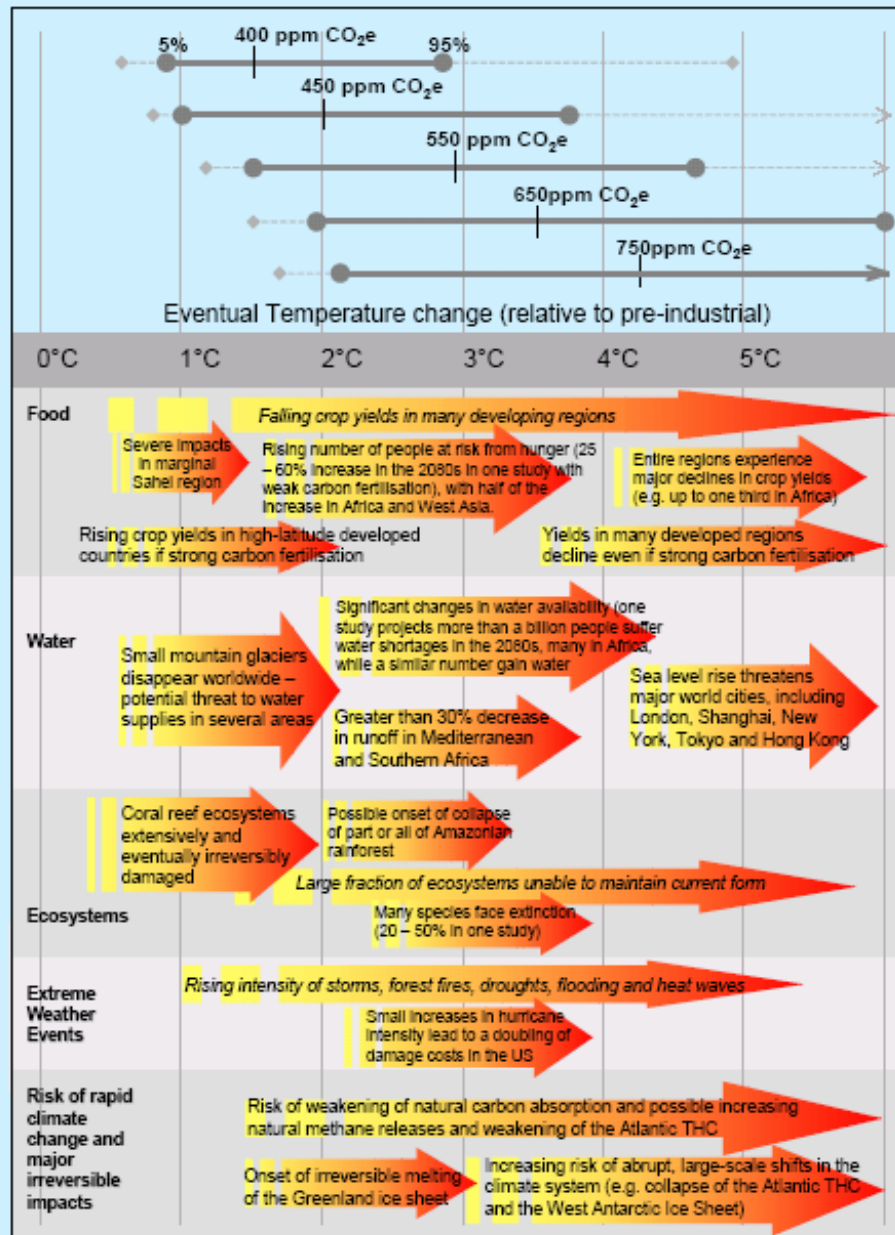
Fortunately, companies like Duke Energy, General Electric and DuPont have joined with other corporations to advocate mandatory cap-and-trade legislation. This U.S. Climate Action Partnership recently issued a statement, saying that:

*“[P]olicies are needed to speed the transition to low-and zero emission stationary sources that can cost effectively capture CO2 emissions for geologic sequestration.”*

And last week the Massachusetts Institute of Technology (MIT) released its report “The Future of Coal—Options for a Carbon Constrained World,” which said advanced technologies are available to build power plants that can capture carbon dioxide from coal, but that large scale tests ***must be completed within the decade*** (emphasis added) to ensure that the country can safely and reliably store the amount of carbon generated from these plants. Enactment of a federal policy will accelerate both the research in carbon capture and the deployment of advanced coal technologies.

**Figure 2 Stabilisation levels and probability ranges for temperature increases**

The figure below illustrates the types of impacts that could be experienced as the world comes into equilibrium with more greenhouse gases. The top panel shows the range of temperatures projected at stabilisation levels between 400ppm and 750ppm CO<sub>2</sub>e at equilibrium. The solid horizontal lines indicate the 5 - 95% range based on climate sensitivity estimates from the IPCC 2001<sup>2</sup> and a recent Hadley Centre ensemble study<sup>3</sup>. The vertical line indicates the mean of the 50<sup>th</sup> percentile point. The dashed lines show the 5 - 95% range based on eleven recent studies<sup>4</sup>. The bottom panel illustrates the range of impacts expected at different levels of warming. The relationship between global average temperature changes and regional climate changes is very uncertain, especially with regard to changes in precipitation (see Box 4.2). This figure shows potential changes based on current scientific literature.



The potential to delay action globally by a decade becomes very real if the U.S. does not enact GHG limits soon and join international efforts to reduce global warming pollution. As it stands, the U.S. has refused since 1997 to join the rest of the world's developed nations in this effort. If the country continues to remain on the sidelines, emissions reduction targets and mechanisms established by other industrialized nations are not likely to survive, and the past decade of efforts to address global warming could fail entirely.

In December 2005, in Montreal, the parties to the Kyoto Protocol agreed to begin negotiations on a new round of binding GHG emissions reduction targets. The negotiations are to be completed by December 2009, or by 2010 at the latest – a date timed precisely to address the fears of Canada, Japan, and others who made it clear that they were unwilling to commit to a second set of binding targets without U.S. participation. Unless a new set of binding international targets is agreed upon in time to take effect in 2013, the major international emissions reduction mechanisms that are now in operation or under construction will collapse.

One of the most important issues facing the parties is how to handle the growing emissions from developing countries, most notably China, and to a lesser extent, India. Future increases in emissions will come predominantly from developing countries as their economies grow. Developing countries are expected to account for more than 75% of the increase in emissions between 2004 and 2030, with China alone accounting for 39% of that expansion.<sup>1</sup> Nonetheless, because of its greater contribution to global warming historically, the U.S. will continue to bear the largest single responsibility for global warming for decades to come. If the U.S. has not established its own carbon limits and is not a party to the agreement, it will have no official authority to shape future agreements and no moral authority to encourage developing countries to embrace cleaner technologies in the development of their economies.

## **II. Options for Federal Climate Programs**

NET recommends the Committee design a comprehensive policy that establishes an economy-wide cap on GHG emissions that is consistent with the trajectory of reductions that scientists say is necessary to stabilize emissions and

- Creates a trading system utilizing market mechanisms to achieve cost-effective emissions reductions; and
- Includes complementary policies to encourage greater efficiency and reduce emissions from small emitting sources, like automobiles and buildings.

### **Cap-and-Trade.**

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<sup>1</sup> Malte Meinshausen, "On the Risk of Overshooting 2°C: Implications of the Uncertainty in Climate Sensitivity for the Derivation of 'Safe' Stabilization and Peaking Concentrations," Swiss Federal Institute of Technology, January 27, 2005

A comprehensive cap-and-trade program establishes a market-based mechanism to control GHGs. A cap-and-trade system starts by establishing an overall cap, or limit, on the number of emission units that all regulated entities may release in a given time period.

It is possible to establish a trading system without a cap, such as the Chicago Climate Exchange (CCX). The CCX provides a voluntary trading program in which companies or municipalities agree to reduce their emissions below a baseline. The platform facilitates trading between participants and the purchase of offsets.

But that trading market alone would not guarantee specific pollution reductions and the allowance prices would be much lower than under a cap, depriving the economy of incentives for new technologies. A national mandatory cap should establish firm limits on greenhouse gases, necessary to guarantee environmental goals are met.

To create a trading system, the total emissions under the cap are divided into individual permits, which are distributed by way of either free or auctioned allowances, or both. The trading program then allows companies to buy and sell permits in any manner that facilitates profit maximization. This flexibility gives the cap-and-trade program a major advantage over the “command and control” approach of merely capping emissions, by turning what could have been a costly mandate into a market.

The cap-and-trade system yields a far preferable method for obtaining these reductions than, for example, a carbon tax. While economists will point out that a tax can be efficient, it also carries inherent weaknesses. Such a carbon tax without a national cap would:

- Be highly regressive, especially impacting low-income consumers by increasing costs on gasoline, home heating oil, and other essentials of modern life;
- Lack the flexibility needed by industry leaders to design business strategies enabling them to reduce emissions in the most cost effective way;
- Be highly subject to fluctuations in the economy;
- Would not provide predictable progress toward specific emission reduction targets;
- Not be compatible with international trading and cooperation mechanisms; and
- Be politically infeasible.

### **Complementary Policies.**

Twenty-eight states have developed climate action plans, which vary greatly in their scope, but all seek to reduce emissions in similar ways. Nearly all include a greenhouse gas inventory, goals for greater energy efficiency both by the state government and private sector, and mandating increases in renewable fuels.

Foremost among these, the Regional Greenhouse Gas Initiative (RGGI) was launched in 2003 by nine states as the first domestic carbon cap-and-trade system for a regional electric power sector. The RGGI model acknowledges the role that complementary programs can play in reaching emission reduction goals by requiring that at least 25% of

the pollution allowances be auctioned to generate revenue for “public benefits” aimed at increasing efficiency and helping to pay for the costs of compliance.

Some RGGI states, including Connecticut and New Jersey, have adopted energy efficiency resource standards, strengthened building codes and improved appliance standards in order to cut electricity demand growth and meet their pollution reduction goals.

Several current legislative proposals specifically incorporate complementary proposals, such as the adoption of the California [Pavley] standard for cars, a renewable electricity standard, and a requirement to set annual end-user energy saving targets. Combining these policies with a cap-and-trade program produces greater emissions reductions, as well as cost savings to consumers and industry.

### **III. Issues in Designing a Comprehensive Climate Policy System**

#### **Economy-Wide Carbon Cap**

##### *i. Sources and pollutants to be covered*

Until recently, the experience of cap-and-trade programs in the U.S. has been limited to the power sector. Yet GHGs are generated by multiple sectors; therefore, emissions should be reduced across the economy. A sector-specific cap may not be sufficient to achieve the reductions necessary to slow down the impacts of climate change, and may impose excessive economic burden on one sector, leaving other pollution sources uncontrolled. On the other hand, an economy-wide cap ensures that all sectors operate under the same limit, which would, in theory, level the playing field by requiring all sectors to address GHG emissions on the same timetable, enabling all to participate in the same market.

NET recommends that Congress establish an economy-wide cap, but include complementary policies to ensure that the cap levels are reached. This is essentially the model adopted by the Kyoto Protocol, which establishes a cap-and-trade program at the country level and allows for trading between nations. It is up to participating countries to determine how they will meet their cap and establish more specific rules for trading among sectors within the country.

While the international target assumes all sources of GHG will be covered, it allows individual countries to design domestic programs that will enable it to meet its targets. Learning from the experience of other countries, as well as states and regions within the U.S., we can design a cap and complementary policies that will most cost-effectively reduce pollution.

The European Union Emissions Trading Scheme (EU-ETS) is one of several policy measures adopted in order for EU member states to meet their Kyoto targets. The EU

approach aims to achieve economy wide coverage through both multi-sector and sector specific programs. The EU-ETS only uses a cap to regulate electricity producers and key large industrial sources (oil refineries, coke ovens, metal ore and steel, cement kilns, glass, ceramics, paper and pulp) representing about half of EU carbon dioxide emissions. However, there are plans to bring aviation into the EU-ETS cap-and-trade system.

In addition, the EU-ETS currently only regulates carbon dioxide emissions but may be expanded to cover other greenhouse gases. The EU has also implemented other regulations to cover sectors not included in the EU-ETS, such as transportation

*ii. Effects on emission reduction, the U.S. economy, consumer prices, and job creation*

The Committee's development of climate policy needs to be aided by specific research to determine the economic effects of climate policy. The research done to date is split between EIA modeling of various Senate bills and NGO modeling of complementary policies. To date, there is little research that combines the two approaches.

The EIA modeling of climate proposals is difficult to analyze accurately because it does not lend itself to an "apples-to-apples" comparison. The modeling was done over the course of several years, which means that assumptions about energy costs, demand, and sources of power are vastly different from year to year.

In addition, some of EIA's assumptions need to be modified to produce a more realistic view of the technologies that are readily deployable. For example, EIA's assumptions on the availability of nuclear power are much more optimistic than studies performed by both the Electric Power Research Institute (EPRI) and the Idaho National Laboratory. Furthermore, EIA's modeling does not reflect a role for low-carbon coal technologies, as outlined by the recent MIT report.

Despite these problems, one common theme did emerge in a comparison of EIA modeling of current legislative proposals done by the Clean Air Task Force (CATF). CATF observed that the modeling consistently indicated that around 80% of the emissions reductions under all proposed cap-and-trade programs would come from the utility sector and only 20% from other sectors.<sup>2</sup> This finding suggests that additional programs are needed to address the emissions from transportation and other major sectors of the economy.

NET would urge the Committee to work with EIA to modify its assumptions and analyze a range of policy options that combines cap-and-trade programs with the complementary policies to get a clearer idea of the economic impacts of a comprehensive program. While none of the EIA analyses of the current legislative proposals consider these complementary policies, there is some interesting data from the states' experience.

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<sup>2</sup> Summary of EIA Climate Policy Analyses: A National Overview. Prepared for National Environmental Trust by the Clean Air Task Force. November 6, 2006.

As a core part of the RGGI rule's development, the states conducted extensive modeling of the regional power sector to assess RGGI's potential impacts. Part of this modeling effort was dedicated to simulating the impact of accelerated energy efficiency deployment scenarios. Viewing the models results as a whole, the American Council for an Energy-Efficient Economy concludes:

*“[E]nergy efficiency can substantially reduce energy demand, carbon emissions, energy prices, and carbon allowance prices, and can also generate positive economic effects. These effects can play a key role in making the RGGI system work more effectively and at substantially lower cost.”*

The study showed that ***doubling the current level of energy efficiency spending*** in the RGGI region would yield several very favorable effects on the carbon cap-and-trade system. It would:

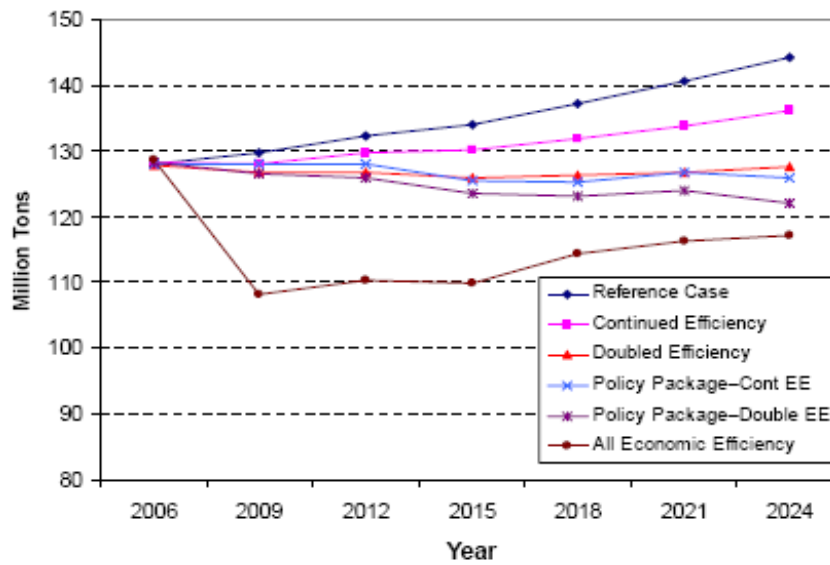
- Reduce electricity load growth by about two-thirds in 2024;
- Reduce electricity price growth to almost nothing until 2020, when an increase in price will have less than 1% impact on wholesale power market prices;
- Keep carbon emissions flat through 2024, compared to the reference case (see figure ES-2);
- Reduce carbon allowances prices by about two-thirds to around \$2/ton in 2024 (see figure ES-3);
- Reduce total energy bills for electricity customers of all types (in 2021 the average bill will be lower by \$109 than reference case);
- Increase regional economic growth from almost no effect to 0.6% positive in 2021, relative to the reference case; and
- Increase private-sector job growth by 0.8% in 2021.<sup>3</sup>

While the RGGI model results give a good indication for the potential benefits that advanced energy efficiency programs may have on a cap-and-trade system, as well as on the U.S. economy as a whole, it also indicates that more research is needed. State efficiency programs vary significantly in their scope and effectiveness, so national results may differ from the RGGI projections. Another key distinction between the RGGI program and most current proposals is that it caps only the power sector. But given their cost-effectiveness and availability, energy efficiency measures merit more discussion and analysis.

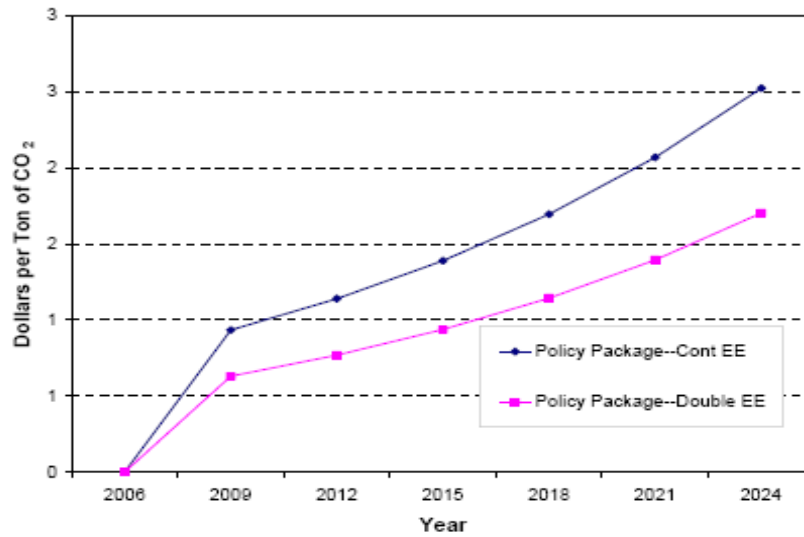
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<sup>3</sup> For more information *see*, William R. Prindle, Anna Monis Shipley, and R. Neal Elliott, "Energy Efficiency's Role in a Carbon Cap-and-Trade System: Modeling Results from the Regional Greenhouse Gas Initiative," American Council for an Energy-Efficiency Economy, May 2006. Hereafter "ACEEE EE Role in Carbon Cap-and Trade System.") Available at: <http://aceee.org/pubs/e064.pdf?CFID=2112871&CFTOKEN=87852429>

**Figure ES-2. CO<sub>2</sub> Emissions**



**Figure ES-3. Carbon Allowance Prices**



Comparable results came from a recent study conducted by the University of Michigan that looked at the environmental and economic impact of eight similar climate strategies, including:

- Establishment of renewable portfolio standards;
- Enhancement of appliance energy standards;
- Implementation of alternative fuels (ethanol tax credit and renewable fuel standard);
- Sequestration of carbon through tree planting;
- Enactment of stronger energy efficiency residential building codes;
- Mandatory switching of mass transit fuels;
- Providing alternative vehicle technology tax credits; and
- Establishing incentives for combined heat and power.

The study showed that these proposals to reduce emissions can also boost the economy and create new jobs. The report found that implementing these in the state of Michigan alone would reduce 84 million tons of carbon dioxide equivalents by 2025, while increasing gross state product by an average of \$380 million annually and increasing statewide employment by 3,400 full-time jobs.<sup>4</sup>

According to this study, the Renewable Portfolio Standard (RPS) alone generated almost 900 job-years and increased gross state product by \$65 million annually while saving 40 million tons of carbon dioxide equivalent, more than any other measure in the analysis. Economic benefits from a RPS are achieved primarily by the construction sector and consumers who benefit from lower electricity prices once new facilities are constructed.

Energy efficiency standards for appliances also contributed to significant reductions (7.35 million tons of CO<sub>2</sub> equivalents) while increasing gross state product by more than \$40 million annually and generating 437 job-years. This measure also benefits consumers by lowering electricity bills.

### **Setting the Cap**

The most cost effective path toward emissions reductions is through the use of the "declining cap," rather than a series of individual caps over an extended period of time. The Climate Stewardship Act of 2003 was an example of a 2-step cap; it called for capping emissions at 2000 levels by 2010 and then at 1990 levels by 2015. Such a stair-step policy can be effective at significantly reducing emissions, as occurred in the Acid Rain program, but it fails to lay out a path for pollution reduction in the long-term and can be more costly than a gradual, steadily declining cap.

A declining cap with longer-term goals provides slow and steady reduction mandates, giving industries time to adjust practices at lower cost, achieve greater emission reductions, and better plan for future investments. The Safe Climate Act of 2006, for

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<sup>4</sup> University of Michigan, Center for Sustainable Systems, "Michigan at a Climate Crossroads: Strategies for Guiding the State in a Carbon Constrained World," Executive Summary -- DRAFT, March 2007

example, calls for reducing emissions by 2% per year up to 2020 and then by 5% per year up to 2050, with the end goal of achieving 20% below 1990 levels by 2050.

Current U.S. policy, however, is based on annual *intensity* reductions. Intensity measures only the amount of emissions per unit of economic output, as opposed to absolute emissions. Using emissions intensity as a greenhouse gas measurement can be deceiving because even if intensity remains the same or decreases, absolute emissions can actually rise substantially.

For instance, according to a GAO study, between 1980 and 2000, U.S. emissions rose 22.5 million metric tons but, during the same period, our emissions intensity fell by 34.7%.<sup>5</sup>

Moreover, the current policy is purely voluntary. It therefore holds out no more than a hope of slowing the growth in pollution over time. To reduce atmospheric concentrations of GHGs most effectively, it is necessary to set an absolute cap in terms of tons of greenhouse gases rather than aim for an intensity decrease.

### **Allowance Distribution**

The distribution of allowances, or permits, is one of the most controversial issues about a cap-and-trade system, because it can pit environmental protection against business interests in easing the costs of compliance. At issue is whether permits should be grandfathered or auctioned off, or some combination of both.

NET recommends a hybrid approach that sets specific guidelines for grandfathering allowances and phases them out over time. This approach is consistent with the finding of the Senate Energy Committee, following an April 4, 2006, workshop that involved the participation of over 160 businesses, environmental groups, trade associations and research institutions.

A significant number of the participants in that conference emphasized that at the point of regulation (a) some allowances should be auctioned rather than given for free; and (b) some free allowances may be given after the starting point of regulation if necessary to mitigate the cost burden of the program. Other options include a more gradual transition to an auction. While estimates vary, the Center for Clean Air Policy suggests that grandfathering only 9% of total allowances is sufficient to adequately minimize costs to industry.<sup>6</sup>

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<sup>5</sup> Government Accountability Office, "Greenhouse Gas Emissions Intensity," GAO Report 04-416R, Washington, D.C.: Government Printing Office, 2003. Available at: <http://www.gao.gov/new.items/d04146r.pdf>

<sup>6</sup> For more information, see: Smith, Anne, and Martin Ross, "Allowance Allocation: Who Wins and Loses under a Carbon Dioxide Control Program?" Center for Clean Air Policy: Washington, DC. Available at: [www.ccap.org/pdf/ccap\\_cra\\_report.pdf](http://www.ccap.org/pdf/ccap_cra_report.pdf)

NET believes that allocations should be disbursed in a manner that favors equitable and environmentally favorable outcomes, and thus should be distributed in keeping with the following criteria:

- Allocations should be based on historic power output, updated over time, which avoids both penalizing new entrants and providing allowances to defunct entities or shuttered units;
- No allocation should be provided to existing nuclear and large hydropower facilities to avoid unearned “windfall” profits;
- Allocations must be provided for public interest resources, including renewable energy, advanced technology and energy efficiency measures; and
- Allocations must be provided for public interest equitable considerations, such as energy assistance to the poor, worker training, and adaptation to climate change impacts, etc.

Auctioning the allowances distributes the cost burden of reducing pollution equitably by requiring all emitters to pay the same price for allowances. An auction has several significant benefits:

- The creation of a source of revenue that can be used to offset expenses by affected entities or groups;
- Avoidance of “windfall” profits that might otherwise accrue to emission sources if allowances are allocated at no charge;
- Avoidance of politically contentious issues regarding allocation methodology;
- The most efficient distribution of allowances with cost transparency that provides an immediate price signal in the allowance market;
- An equal opportunity for new entrants into the allowance market that avoids continuing allocations to entities that cease operating;
- The true cost of production is internalized, while a strong incentive to change future behavior is created;
- Compatibility with a “free-allocation” approach in a hybrid system that phases out the free allocations over time; and
- Decreasing political opposition from sources worried about the cost of allowances.

### **Cost Saving Mechanisms**

There are several types of cost saving mechanisms that can be applied to a cap-and-trade system to lower the cost of compliance. The test of a successful cost saving mechanism is whether it will provide stability to the market without weakening the environmental effectiveness of the entire plan.

A cost saving mechanism included in a couple of current legislative proposals, the so-called “safety valve,” fails that test. While the safety valve (or, more appropriately “price escape”) will provide price stability, it weakens the environmental effectiveness of the program so dramatically that it undermines the entire goal of the carbon cap itself. It would pose serious threats to the integrity of the cap and would undermine incentives for new technology development and deployment. Price escapes, or safety valves, for

example, are often set at low price levels and end up acting like a weak tax. The unlimited buying power makes the emissions cap obsolete, and the allowance simply becomes a revenue-generating mechanism. It is preferable not to have a price escape, but if such a measure is necessary, it should be set high enough to encourage real action. EIA estimates that new technologies do not enter the market until the market price for emissions reduction rises to over \$25 per ton.<sup>7</sup>

Energy efficiency and other complementary measures (discussed earlier) meet the requirements of a good cost saving mechanism. NET believes these programs should be aggressively pursued as a preferred approach to reducing costs, but we also acknowledge other useful mechanisms, including limited offsets and early reduction credits. Some guidelines on the use of these mechanisms are offered below.

### **Offsets**

Offsets are a means to achieve overall GHG emission reductions from sources outside the cap, at a lower cost to the regulated entity. Regulated entities could get emissions credits for their investments, helping them to meet the cap in a more flexible way and in the least expensive way. Such investments could include:

- Increasing carbon sequestration through forestry and agriculture projects;
- Reducing energy use in non-electric end-uses; and
- Reducing methane emissions from coal mines and landfills.

Yet, there are many challenges in the process of defining allowable offsets. Some of the challenges are:

- To ensure that an offset will produce new emission reductions that would not otherwise have occurred;
- To ensure that estimated reductions are actually realized; and

NET supports the limited use of offsets, provided that they are quantifiable, verifiable and permanent, and are not so generous as to undermine the technology incentives produced by the emissions cap. Offsets, for instance, may be a more cost effective way to reduce fugitive emissions, like the carbon dioxide that escapes when cropland is tilled and forests are harvested, and the methane that escapes during coal extraction.

Also, offsets should be limited to initiatives within the U.S. so the external benefits of these investments (e.g., overall reduction of pollutants other than greenhouse gases), would benefit the U.S. public health and economy.

Fortunately, through the extensive process of involving all stakeholders in developing the RGGI plan, we've already gained some knowledge and experience with setting offsets in

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<sup>7</sup> Summary of EIA Climate Policy Analyses: A National Overview. Prepared for National Environmental Trust by the Clean Air Task Force. November 6, 2006.

a cap-and-trade system. It is worth learning from this experience how to best design such a mechanism to achieve maximum reduction of emissions.

The implementing rule for the RGGI system includes a provision allowing power plants to use offsets to account for up to 3.3% of their overall emissions, an amount equal to approximately half of a source's emissions reduction obligation. Offset projects in the model rule include:

- Capturing landfill methane from farming operations or from leaking natural gas infrastructure;
- Implementation of end-use natural gas or heating oil energy efficiency;
- Afforestation projects; and
- Capturing sulfur hexafluoride (SF<sub>6</sub>) emissions from electricity transmission and distribution equipment.

### **Early Reduction Credits (ERCs)**

ERCs could become a cost-saving measure without undermining environmental performance if appropriate rules are established to ensure the reductions are genuine, verifiable and certified by an independent, credible third party. Unfortunately, past efforts by the federal government to provide credit for early action have failed all of these criteria. The existing DOE Voluntary Reporting of Greenhouse Gases Program allows participants to account for emission reductions in practically any way they choose – different base years, different calculation methods, etc.

While a few companies show increases in energy generation and use efficiency, they also submit information on projects for which emission reductions are incidental, or that are based on guesses of potential impacts with little supporting data. Many of the so-called reductions actually conceal increases in emissions, and some projects are submitted for multiple credits without checks for double-counting. Of the 18 large utilities examined by NET, only 3% of the claimed reductions actually represent a decrease in net emissions, while the other 97% did not result in actual emission reductions. If this data was used as the basis of awarding emissions credits, the windfall to the companies involved would be staggering, with little reduction in actual emissions.

In addition, ERCs need to be limited by a cap of around 5% or 10% annually. Care must be taken to ensure that ERCs do not increase the total GHG cap. The “Strong Economy and Climate Protection Act of 2006” had some of the best legislative provisions to include the use of early action credits without undermining the effectiveness of the cap. It allowed firms to receive credit for actions taken between 2000 and the passage of the legislation, limited credits to 5% of the base year, and instructed that those credits not be used to increase the level of the cap.

### **Encouraging Technology Development**

The electricity and transportation sectors, which account for 60% of emissions in the U.S., will need major re-engineering if we are going to stabilize greenhouse gas levels. A cap-and-trade system can set a price for carbon that spurs efficient technology

deployment, but investment in cleaner technologies is necessary so that these options are available once the market is in place. Therefore, a cap-and-trade proposal must be accompanied by investment in new technology, particularly in these crucial sectors. The cap-and-trade system alone is not enough to drive technology development.

In the electricity sector, for instance, coal provides about half of electricity generation and more than 80% of CO<sub>2</sub> emissions. A recent study from MIT identifies carbon capture and storage (CCS) technology as the “critical enabling technology” that will allow the U.S. to reduce emissions while continuing high levels of coal consumption.<sup>8</sup>

Several studies have shown that a price on carbon of between \$20-30 per ton, such as could be created by a strong cap-and-trade bill, is necessary to drive investment in new domestic power generation from traditional pulverized coal plants to such low-carbon, coal power generation technologies as integrated gasification combined cycle (IGCC) with carbon capture and sequestration (CCS).<sup>9</sup> A cap-and-trade bill or other mechanism that sets a price on carbon in this range is therefore critical to make clean coal technologies competitive and spur their deployment.

In order for CCS technology to be commercially available by 2015 or 2020, however, much work is needed now to develop this technology, for which government support will be crucial. The MIT study identifies several steps that need to take place before CCS technology is ready for commercial deployment. The study emphasizes the immediate need for demonstrating integrated CCS, including the capture, transport and storage of CO<sub>2</sub>, at the scale of one million tons annually in a variety of locations.

NET believes the Committee should include authorization for these projects in its global warming bill. Detailed recommendations on the specifications of these projects are available from the author of the Geologic Sequestration chapter of the MIT report, S. Julio Friedmann, Energy & Environment Directorate, Lawrence Livermore National Labs. Friedmann believes that 3-4 demonstration projects in a suite of geologic settings in the United States could largely resolve present scientific uncertainty and demonstrate engineering practice for practical sequestration projects.<sup>10</sup> The projected cost of each project \$13-28 million/year and the projects would need to be run for 8 – 10 years. While this is not a small amount of money it is still less than the subsidies provided to the nuclear power industry in the 2005 Energy bill.

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<sup>8</sup> Massachusetts Institute of Technology, "The Future of Coal: Options for a Carbon-Constrained World," 2007. Available at: <http://web.mit.edu/coal/>

<sup>9</sup> Major sources of information on price signals needed to shift new investment towards low-carbon coal technologies in the Energy Information Administration's (EIA) modeling of the various climate proposals using the National Energy Modeling System (NEMS), recent work at MIT including "The Future of Coal," and the 2005 Intergovernmental Panel on Climate Change "Special Report on Carbon Dioxide Capture and Sequestration."

<sup>10</sup> "Current status, critical gaps, and recommendations for deployment," A presentation of S. Julio Friedmann, Energy & Environment Directorate, LLNL Visiting Scientist, Earth Atmospheric & Planetary Science, MIT, September 2005

According to MIT, the next priority would be demonstrations using a variety of coal technologies, including IGCC. The report concludes that additional government R&D will be needed to stimulate these demonstrations and to make CCS technology widely available in the near future. While a cap-and-trade bill could establish future demand for CCS and other clean technologies, investment in R&D is necessary to make sure that these technologies are available commercially.

#### **IV. The Place of the U.S. Program in the Global Efforts**

The most important thing the U.S. can do to encourage the efforts of other nations is to pass a mandatory limit on carbon emissions and re-engage in international efforts to reduce greenhouse gases. Congress has the opportunity to put a carbon cap in place before the next round of emission reduction targets will be negotiated by the parties to the United Nations Framework Convention on Climate Change, which was signed by the first President Bush and ratified by Congress.

The next round of negotiations will establish a new series of targets for the developed world and will adjust the responsibilities of the developing countries. If the U.S. has not established its own carbon limits and is not a party to the agreement, it will have no official authority to shape future agreements and no moral authority to encourage developing countries to embrace cleaner technologies in the development of their economies.

Future increases in emissions will come predominantly from developing countries as their economies grow. Developing countries are expected to account for more than 75% of the increase in emissions between 2004 and 2030, with China alone accounting for 39% of that expansion.<sup>11</sup> Nonetheless, because of its greater contribution to global warming historically, the U.S. will continue to bear the largest single responsibility for global warming for decades to come.

While the projected growth of emissions, particularly in China, can seem daunting, the recent MIT report called *The Future of Coal* provides several reasons to believe that productive engagement on the issue of climate is possible. The report notes that the lack of a clear Chinese national energy strategy, as well as the autonomy and power of the complex, state-owned energy companies, offers both challenges and opportunities. It cautioned against attributing China's aggregate energy demand growth to central government agendas or geopolitical strategy:

*“What many outsiders see as the deliberate result of Chinese national ‘energy strategy’ is in fact better understood as an agglomeration of ad hoc decisions by local governments, local power producers, and local industrial concerns.... Finally, we should recognize that China’s energy system is in its own way as*

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<sup>11</sup> *Ibid.*

*politically complex, fractured and unwieldy as our own. And we would be unwise to expect of the Chinese what we do not expect of ourselves.” (pgs 65 & 72)*

It is important to remember that developing countries have as much, if not more, reason to fear the impacts of climate on their own countries. In China, scientists warn that the impact of rising temperatures on the Qinghai-Tibet plateau could alter the amount of water flowing into the Yangtze and Yellow Rivers, which originate in the region.

The same sort of impact may be felt in key Indian river systems. Glacial melt would lead to increased summer flows in some directions for a few decades, followed by a reduction as glaciers disappear. In a scenario that includes the melting of Greenland ice caps, the many towns and villages in low-lying areas in China will be facing relocation issues similar to U.S. Alaskan Natives and it is possible that currently landlocked Mongolia could find itself with a coastline.

All these water related issues and other global warming impacts can have serious effects on agriculture. India's agricultural productivity, already flagging, is thought likely to suffer because of high temperatures, drought, and flood and soil degradation brought on by global warming. The Chinese media have cited similar scenarios, including a fall in grain output by 10% a year from 2030. Such threats run counter to the maintenance of food security, which both governments prize.

Concern about these impacts is why China and India are parties to the Kyoto Protocol and have undertaken some notable goals and strategies to reduce their emissions. As a developing country, China does not have emissions targets but can voluntarily reduce its GHG emissions by participating in a trading system under a flexibility provision of the Protocol called the Clean Development Mechanism (CDM).

China has dominated the CDM market to date, with 60% of the volume of credits transacted in 2006, representing secured contracts approaching \$1.5 billion for the first three quarters of 2006 (in addition to approximately \$2 billion in 2005). These projects represent investment in a variety of emissions-reducing technologies, including renewable energy, industrial energy efficiency and end-of-pipe GHG reduction technologies.<sup>12</sup>

China's sale of GHG credits will contribute to emissions reductions for years to come. China heavily taxes (65%) the projects that produce the largest volumes of credits with low initial investment, in order to limit windfall profits to certain industries. These government revenues go to a Clean Development Fund that is reinvested in additional emissions reducing projects in key areas, such as renewable energy and energy efficiency.<sup>13</sup> In this way, China is maximizing its participation in emissions trading under the Kyoto Protocol, while scaling up its investment in climate-friendly technologies.

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<sup>12</sup> World Bank and International Emission Trading Association, "State and Trends of the Carbon Market 2006." Available at: <http://carbonfinance.org/docs/StateoftheCarbonMarket2006.pdf>

<sup>13</sup> World Bank, "HFC-23 Project Questions and Answers." Available at: [www.worldbank.org](http://www.worldbank.org).

China has put into place renewable energy targets and fuel efficiency standards that equal or exceed the U.S. goals in those same areas. China's Renewable Energy Law set a target to generate 20% of electricity from renewables by 2020.<sup>14</sup> In comparison, the United States generated approximately 9% of its electricity from renewable sources in 2005.<sup>15</sup>

Unless Congress puts a renewable energy standard in place, the U.S. Department of Energy expects that renewable energy will continue to account for less than 10% of electricity generation in the United States through 2030.<sup>16</sup> China's standards for passenger vehicles require fuel efficiency of 34 mpg in 2005 and 37 mpg in 2008.<sup>17</sup> The World Resources Institute indicates that the U.S. would need to increase fleet wide fuel economy by 10% just to meet China's 2008 standards, while greater efficiency increases are required to meet President Bush's gasoline savings target.<sup>18</sup>

Given the speed with which China is growing, however, even more institutional changes will be necessary to address its carbon emissions. There is some opportunity for limited development of less carbon intensive energy infrastructure in key parts of the country.

The MIT study notes that air quality and other pollution issues related to a heavy reliance on coal are already creating political and economic pressure to consider the use of cleaner fuels, like natural gas. More developed provinces, particularly coastal regions, may slow their use of coal, which comes from the interior of China, in favor of natural gas that they can acquire through the building of Liquefied Natural Gas (LNG) terminals. Provincial-level municipalities like Shanghai, which are under pressure to provide adequate power supplies while also facing growing demands by an increasingly sophisticated public for a better environment, recognize the need for cleaner approaches.

Shifting from coal also enables these Chinese stakeholders to ally their interests with the state oil companies. Indeed, the MIT report finds that, "commercial and quasi-commercial interests at the local and national levels—almost always in cooperation with international investors—are moving China's coastal regions, if not China as a whole, down a natural gas intensive path." (Page 71)

It is also possible that investments the U.S. needs to make in next-generation coal technologies use may provide important opportunities for engagement with China. One of the central messages of the MIT study is that carbon capture and sequestration (CCS) demonstration projects, at commercial-scale advanced coal plants, will shorten the deployment time and reduce the cost of CCS, once carbon limits are adopted.

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<sup>14</sup> Pew Center on Global Climate Change, "Climate Change 101: International Action." Available at: <http://www.pewclimate.org/docUploads/PEW%5FClimat%20101%20Intl%2Epdf>

<sup>15</sup> Energy Information Administration, "Annual Energy Outlook 2007 (Early Release)." DOE/EIA Report 0383, 2007. Available at: <http://www.eia.doe.gov/oiaf/aeo/index.html>

<sup>16</sup> *ibid.*

<sup>17</sup> CCAP, *op. cit.*

<sup>18</sup> Amanda Sauer and Fred Wellington, "Taking the High (Fuel Economy) Road," World Resources Institute, 2004. Available at: [http://pdf.wri.org/china\\_the\\_high\\_road.pdf](http://pdf.wri.org/china_the_high_road.pdf)

With respect to China and developing countries, the report concluded, “An international system with modestly delayed compliance by emerging economies is manageable from the point of view of incremental accumulated CO<sub>2</sub> emissions. However, if other nations, and especially China and India, are to deal with this problem then CCS is a crucial technology for these countries as well, and the R&D and commercial demonstration focus proposed here is no less important in readying CCS for quick adoption if and when they begin to take more stringent control measures.”

**Options for engaging China post-2012.**<sup>19</sup>

For all the reasons previously discussed, China is unlikely to agree to binding targets in the next round of Kyoto negotiations. But other proposals outside of the established framework include establishing sectoral agreements, and are beginning to appear more promising. These proposals could take the form of emissions targets for a particular sector, technology- or performance-based standards, or “best practice” agreements. Agreements could be undertaken between governments and/or companies on a bilateral or multilateral basis. Such agreements could help to address some of the competitiveness issues that arise in the current framework.

Sectoral agreements are just one alternative for beginning to build an international agreement on climate change. The MIT research seems to indicate that sectoral agreements may be a better way to engage the quasi-governmental and state-owned businesses in climate goals. To be effective, sectoral agreements should be coordinated with other action, such as globally agreed technology incentives, cap-and-trade, and policy based agreements.

U.S. engagement in the process is critical to getting China to make commitments. As the two largest annual emitters of carbon dioxide in the world, no international system can hope to be successful without the participation of both our countries. The work of this Committee can help put the U.S. on a path to constructive engagement with China and the rest of the international community on this matter of vital public concern.

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<sup>19</sup> This section summarizes the Pew Center on Global Climate Change's "International Climate Efforts Beyond 2012: Report of the Climate Dialogue at Pocantico." Available at: <http://www.pewclimate.org/pocantico.cfm>. CCAP and IEA also discuss sectoral agreements.